

ASSE International

Professional Qualifications Standard for

Infection Control Risk Assessment for All Building Systems

An American National Standard

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Professional Qualifications Standard for Infection Control Risk Assessment for All Building Systems

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Mokena, Illinois
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FOREWORD

Professional Qualifications Standard for Infection Control Risk Assessment for All Building Systems

This foreword shall not be considered a part of the standard. However, it is offered to provide background information.

ASSE International is a membership organization dedicated to the preservation of public health and safety through the use of proper plumbing, piping and mechanical practices. This is accomplished in the spirit of its century-old motto, “Prevention Rather Than Cure.”

Although pathological diseases are as old as mankind, the evolving nature of bloodborne pathogens and how they affect pipe trade workers, maintenance personnel, and other construction craftspeople has basically been ignored. While there is an abundance of professional organizations representing various factions of the piping and mechanical fields, ASSE International is one of very few addressing the critical nature of bloodborne pathogens (and other infectious diseases) and the dangerous roles they play throughout our industry.

To address this potentially hazardous situation, ASSE International has developed the voluntary consensus ASSE Series 12000, *Professional Qualifications Standard for Infection Control Risk Assessment for All Building Systems*. This unique standard series sets minimum criteria for the training and certification of pipe trades craftspeople, and other construction and maintenance personnel, on how to safely work in an environment with the potentially deadly diseases that may be present within their worksites.

This standard series addresses the need for all construction and maintenance personnel and employers, especially within the pipe trades, to become proficient in identifying and managing potential situations where they may be exposed to bloodborne pathogens.

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References

01-1.1 References, Industry Standards and Codes

The following list of references, industry standards and codes are part of the requirements of all Standards within the Series 12000.

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| <p>01-1.1.1 AAALAC, <i>National Research Council Guide for the Care and Use of Laboratory Animals</i>, 8th Edition</p> <p>01-1.1.2 ASHRAE 188, <i>Legionellosis: Risk Management for Building Water Systems</i>, 2015</p> <p>01-1.1.3 ASHRAE, Guideline 12, <i>Minimizing the Risk of Legionellosis Associated with Building Water Systems</i>, 2000R</p> <p>01-1.1.4 ASSE Series 6000, <i>Professional Qualification Standard for Medical Gas Systems Personnel</i></p> <p>01-1.1.5 CDC, <i>Biosafety in Microbiological and Biomedical Laboratories</i>, 5th Edition</p> <p>01-1.1.6 CDC, <i>Guidelines for Immunizations</i></p> <p>01-1.1.7 CDC, <i>Immunization Schedules</i>, http://www.cdc.gov/vaccines/schedules/</p> <p>01-1.1.8 CDC, <i>Developing a Water Management Program to reduce Legionella Growth & Spread in Buildings</i>, www.cdc.gov/legionella/downloads/toolkit.pdf</p> <p>01-1.1.9 CDC and AWWA, <i>Emergency Water Supply Planning Guide for Hospitals and Healthcare Facilities</i>, 2012</p> <p>01-1.1.10 CTI, <i>Legionellosis, Guideline: Best Practices for Control of Legionella</i>, 2008</p> <p>01-1.1.11 IAPMO, <i>Uniform Plumbing Code</i>, 2018</p> <p>01-1.1.12 IAPMO, <i>Uniform Mechanical Code</i>, 2018</p> <p>01-1.1.13 IAPMO, <i>Uniform Swimming Pool, Spa and Hot Tub Code</i>, 2018</p> <p>01-1.1.14 ICC, <i>International Building Code</i>, 2018</p> <p>01-1.1.15 ICC, <i>International Fire Code</i>, 2018</p> <p>01-1.1.16 ICC, <i>International Mechanical Code</i>, 2018</p> <p>01-1.1.17 ICC, <i>International Plumbing Code</i>, 2018</p> | <p>01-1.1.18 ICC, <i>International Private Sewage Disposal Code</i>, 2018</p> <p>01-1.1.19 ICC, <i>International Residential Code for One and Two-Family Dwellings</i>, 2018</p> <p>01-1.1.20 ICC, <i>International Swimming Pool and Spa Code</i>, 2018</p> <p>01-1.1.21 NFPA 99, <i>Health Care Facilities Code</i>, 2018</p> <p>01-1.1.22 NFPA Standards</p> <ol style="list-style-type: none"> 1) NFPA 3, <i>Standard for Commissioning of Fire Protection and Life Safety Systems</i>, 2018 Edition 2) NFPA 4, <i>Standard for Integrated Fire Protection and Life Safety System Testing</i>, 2018 Edition 3) NFPA 13, <i>Standard for the Installation of Sprinkler Systems</i>, 2016 Edition 4) NFPA 13D, <i>Standard for the Installation of Sprinkler Systems in One- and Two-Family Dwellings and Manufactured Homes</i>, 2016 Edition 5) NFPA 13R, <i>Standard for the Installation of Sprinkler Systems in Low-Rise Residential Occupancies</i>, 2019 Edition 6) NFPA 14, <i>Standard for the Installation of Standpipe and Hose Systems</i>, 2016 Edition 7) NFPA 15, <i>Standard for Water Spray Fixed Systems for Fire Protection</i>, 2017 Edition 8) NFPA 16, <i>Standard for the Installation of Foam-Water Sprinkler and Foam-Water Spray Systems</i>, 2019 Edition 9) NFPA 20, <i>Standard for the Installation of Stationary Pumps for Fire Protection</i>, 2019 Edition 10) NFPA 22, <i>Standard for Water Tanks for Private Fire Protection</i>, 2018 Edition 11) NFPA 24, <i>Standard for the Installation of Private Fire Service Mains and Their Appurtenances</i>, 2019 Edition 12) NFPA 25, <i>Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems</i>, 2017 Edition 13) NFPA 150, <i>Standard on Fire and Life Safety in Animal Housing Facilities</i>, 2016 Edition- |
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14)	NFPA 214, <i>Standard on Water-Cooling Towers</i> , 2016 Edition	CSA	Canadian Standards Association, 8501 East Pleasant Valley Road, Cleveland, OH 44131
15)	NFPA 750, <i>Standard on Water Mist Fire Protection Systems</i> , 2019 Edition	CTI	Cooling Tower Institute, 3845 FM 1960, Houston, TX 77068
16)	NFPA 1142, <i>Standard on Water Supplies for Suburban and Rural Fire Fighting</i> , 2017 Edition	EPA	Environmental Protection Agency, 1200 Pennsylvania Ave, Washington, DC 20460
17)	NFPA 1581, <i>Standard on Fire Department Infection Control Program</i> , 2015 Edition	IAPMO	International Association of Plumbing and Mechanical Officials, 5001 E. Philadelphia Street, Ontario, CA 91761
18)	NFPA 5000, <i>Building Construction and Safety Code</i> , 2018 Edition	ICC	International Code Council, 500 New Jersey Ave, 6th floor, Washington, DC 20001
01-1.1.23	NIOSH N-95, <i>Particulate Filtering Facepiece Respirators</i>	NFPA	National Fire Protection Association, P.O. Box 9101, 1 Batterymarch Park, Quincy, MA 02269
01-1.1.24	OSHA 1910, <i>Occupational Health and Safety Standards</i>	NIOSH	National Institute for Occupational Safety and Health, see CDC
01-1.1.25	OSHA 1910,120, <i>Hazardous Waste Operations and Emergency Response</i>	NSF	NSF International, 789 N. Dixboro Rd, Ann Arbor, MI 48105
01-1.1.26	OSHA 1910,141, <i>Sanitation</i>	OSHA	National Institute for Occupational Safety and Health, 1600 Clifton Rd, Atlanta, GA 30333
01-1.1.27	OSHA 1910, 1030, <i>Bloodborne Pathogens</i>	US DOL	United States Department of Labor, Occupational Safety and Health Administration, 200 Constitution Avenue, NW, Washington, D.C. 20210
01-1.1.28	OSHA 1926, <i>Safety and Health Regulations for Construction</i>	WHO	World Health Organization, Avenue Appia 20, 1211 Geneva 27, Switzerland
01-1.1.29	OSHA <i>Technical Manual</i> , Section 3, Chapter 7		
01-1.1.30	US DOL, 29 CFR 1910.1030		
01-1.1.31	US DOL, 29 CFR 1926.21(b)(2)		
01-1.1.32	US DOL, 29 CFR 1926.25		
01-1.1.33	US DOL, 29 CFR 1926.28		

NOTE: All questions related to applicability shall be directed to the Authority Having Jurisdiction (AHJ).

01-1.2 Abbreviations and Standards Development Organizations

AAALAC	Association for Assessment and Accreditation of Laboratory Animal Care International, 5283 Corporate Drive, Suite 203, Frederick, MD 21703
ANSI	American National Standards Institute, Inc., 25 W. 42nd Street, 4th Floor, New York, NY 10036
ASHRAE	American Society of Heating, Refrigeration and Air-Conditioning Engineers, 1791 Tullie Circle, N.E. Atlanta, GA 30329
ASSE	ASSE International, 18927 Hickory Creek Dr, Suite 220, Mokena, IL 60448
AWWA	American Water Works Association, 6666 West Quincy Ave, Denver, CO 80235
CDC	Centers for Disease Control and Prevention, 1600 Clifton Rd, Atlanta, GA 30333

Professional Qualifications Standard for the Health and Safety of the Construction and Maintenance Generalist

5-1.1 Scope

This standard provides general knowledge of pathogens, biohazards and infectious diseases for plumbing, piping, and mechanical systems workers, or any individual who has the potential for exposure to pathogens, biohazards or other potentially infectious material (OPIM), with the objective of providing continuing education. Eligible individuals include any person with an interest in pathogens, biohazards and infectious diseases.

5-1.2 Purpose

The purpose of this standard is to provide minimum criteria, identified by an industry consensus, for construction and maintenance personnel to ensure compliance with the referenced standards in Section 5-1.4.

5-1.3 Limitations

Compliance with this standard in itself shall not constitute compliance with the requirements for the construction and maintenance personnel as defined by ASSE 12010, 12020, 12030, 12040, 12060, 12061, 12062, or 12063.

5-1.4 References, Industry Standards and Codes

The references, industry standards and codes listed in ASSE Standard 12001 are a part of this standard.

5-2.1 General Knowledge

5-2.1.1 The individual who has completed training to the ASSE 12005 shall be able to identify and show knowledge of the applicable laws, codes, rules, listing agencies and regulations from the federal, state and local levels pertaining to pathogens, biohazards and infectious disease.

5-2.1.2 The individual who has completed training to the ASSE 12005 shall be able to identify and describe the basic concepts pertaining to:

- a) Appropriate method for recognizing tasks and activities which may involve exposure
- b) Criteria for the selection, use, cleaning, maintenance, storage, disposal and limitations of personal protective equipment (PPE)
- c) Cryptosporidium
- d) Emergency procedures involving pathogens or OPIM
- e) Employer responsibilities
- f) Epidemiology of pathogens, biohazards and infectious disease
- g) Explanation of an exposure control plan
- h) Exposure protocols
- i) Fecal coliform and Escherichia coli (E. coli)
- j) Fecal indicators (Enterococci or coliphage)
- k) Giardia lamblia
- l) Hepatitis B
- m) Hepatitis B virus (HBV) vaccine protocols
- n) Hepatitis C
- o) Legionnaires Disease
- p) Modes of transmission of pathogens, biohazards and infectious diseases
- q) Mold
- r) Naegleria Fowleri (brain eating amoeba)
- s) Post exposure protocols
- t) Sign and labeling regulations
- u) Total coliforms

- v) Use and limitation of proper work practice protocols
- w) Viruses

5-2.2 Pathogens, Biohazards and Other Potentially Infectious Materials

- 5-2.2.1 The individual who has completed training to the ASSE 12005 shall be able to list the major forms of pathogens, biohazards and OPIM.
- 5-2.2.2 The individual who has completed training to the ASSE 12005 shall be able to identify and describe the routes of transmission of pathogens, biohazards and OPIM.

5-2.3 Pathogen, Biohazards and Infectious Disease Regulations

- 5-2.3.1 The individual who has completed training to the ASSE 12005 shall be able to describe the federal, state and local regulations for the potential exposure to pathogens, biohazards and OPIM relating to:
 - a) Disinfectants
 - b) Disposal of contaminated material
 - c) Hepatitis B vaccinations
 - d) PPE
 - e) Training requirements

5-3.1 Terminology

The individual who has completed training to the ASSE 12005 shall be able to demonstrate a basic working knowledge of all terminology listed in the ASSE Standard 12000 and its appendices.

5-4.1 Certificate

A certificate shall be issued by a recognized third-party certification agency after a minimum one (1) hour training course and the successful completion of a written exam.

Biological Pathogens Professional Qualifications Standard for Construction and Maintenance Personnel

10-1.1 Scope

This standard provides general knowledge of pathogens, biohazards, infectious disease and other potentially infectious material (OPIM) for construction and maintenance personnel, or for any individual who has the potential for exposure. The objective is to provide training, continuing education and certification.

10-1.2 Purpose

The purpose of this standard is to provide minimum criteria, identified by industry consensus, to ensure compliance with the referenced standards and codes in Standard 12001 and the requirements of Standard 12010, and to minimize exposure of pathogens, biohazards and other potentially infectious material (OPIM) in the work place. ASSE Standard 12010 covers construction and maintenance personnel including, but not limited to, plumbers, pipefitters, sprinkler fitters, HVAC technicians, demolition laborers and mechanical systems workers.

10-1.3 Limitations

Compliance with this standard in itself shall not constitute compliance with the requirements for the construction and maintenance personnel as defined by ASSE 12020, 12030, 12040, 12060, 12061, 12062, or 12063.

10-1.4 References, Industry Standards and Codes

The references, industry standards and codes listed in ASSE Standard 12001 are a part of this standard.

10-2.1 General Knowledge

- 10-2.1.1 The ASSE 12010 certified individual, shall be able to identify and demonstrate knowledge of the applicable laws, rules and regulations from the federal, state and local levels pertaining to ASSE 12000.
- 10-2.1.2 The ASSE 12010 certified individual shall be able to identify the proper procedures to notify all Authorities Having Jurisdiction (AHJ).
- 10-2.1.3 The ASSE 12010 certified individual shall be able to demonstrate knowledge of the following concepts:
 - a) Appropriate method for recognizing tasks and activities that may involve exposure
 - b) Criteria for the selection, use, cleaning, maintenance, storage, disposal and limitations of personal protective equipment (PPE)
 - c) Cryptosporidium
 - d) Emergency procedures involving pathogens of OPIM
 - e) Employer responsibilities
 - f) Epidemiology of pathogens, biohazards and infectious disease
 - g) Explanation of an exposure control plan
 - h) Exposure protocols
 - i) Fecal coliform and Escherichia coli (E. coli)
 - j) Fecal indicators (Enterococci or coliphage)
 - k) Giardia lamblia
 - l) Hepatitis B
 - m) Hepatitis B virus (HBV) vaccine protocols
 - n) Hepatitis C
 - o) Legionnaires Disease
 - p) Modes of transmission of pathogens, biohazards and infectious diseases
 - q) Mold
 - r) Naegleria Fowleri (brain eating amoeba)
 - s) Post exposure protocols
 - t) Signage and labeling regulations
 - u) Total coliforms

- v) Use and limitation of proper work practice protocols
- w) Viruses

10-2.2 Vaccination Knowledge

The ASSE 12010 certified individual shall be able to identify and describe the required vaccination guidelines and identify the following components:

- a) CDC guidelines for administering vaccinations
- b) Employees who decline vaccinations
- c) Hepatitis B vaccinations

10-2.3 Exposure Control Plan

10-2.3.1 The ASSE 12010 certified individual shall be able to identify and describe the proper guidelines of the exposure control plan:

- a) Communication of hazards to employees
- b) Exposure determination
- c) Post exposure follow-up
- d) Procedures for evaluating the circumstances surrounding an exposure incident
- e) Recordkeeping
- f) Schedule and method for implementing sections of the standard covering methods of compliance

10-2.4 Precautionary Measures

10-2.4.1 The ASSE 12010 certified individual shall be able to understand the Universal Precautions method: all stagnant water, drainage, waste and vent pipes, human and animal blood, and bodily fluids should be considered potentially infectious.

10-2.4.2 The ASSE 12010 certified individual shall be able to identify and describe the appropriate use and handling of PPE:

- a) Containment of used/contaminated PPE
- b) Reusable PPE
- c) Safe storage

10-2.4.3 The ASSE 12010 certified individual shall be able to describe the precautions and hazards associated with the following:

- a) Damaged PPE
- b) OPIM
- c) Proper gloving techniques
- d) Proper housekeeping
- e) Sharps

10-2.5 Documenting and Recording

10-2.5.1 The ASSE 12010 certified individual shall have knowledge of the following documentation:

- a) Exposure plan
- b) Hepatitis B vaccinations
- c) Medical records
- d) Training records

10-3.1 Terminology

The ASSE 12010 certified individual shall be able to demonstrate a basic working knowledge of all terminology listed in Appendix C.

10-4.1 Certification

All candidates for certification shall meet all of the following criteria:

- 10-4.1.1 Successful completion of an OSHA 10 or OSHA 30 class prior to attending a 12010-training course.
- 10-4.1.2 Successful completion of a minimum 4-hour training course encompassing all aspects of ASSE Standard 12010.
- 10-4.1.3 Successfully pass a written exam with a minimum of 25 questions encompassing aspects of ASSE Standard 12010 with a score of at least 80%.
- 10-4.1.4 Certification to this standard shall be through a nationally recognized third-party certification agency.
- 10-4.1.5 Certification shall be for a three (3) year period.

10-4.2 Recertification

Recertification shall include:

- 10-4.2.1 Successful completion of a minimum one (1) hour of training encompassing all aspects of ASSE Series 12010
- 10-4.2.2 Successfully pass a written exam with a minimum of 25 questions encompassing aspects of ASSE Standard 12010 with a score of at least 80%.
- 10-4.2.3 Certification shall be through a nationally recognized third-party certification agency.
- 10-4.2.4 Certification shall be for a three (3) year period.

Biological Pathogens Professional Qualifications Standard for Construction and Maintenance Employers

20-1.1 Scope

This standard provides general knowledge of pathogens, biohazards, infectious disease and other potentially infectious material (OPIM) for employers, or employers' representatives, of construction and maintenance personnel, or for any individual who is directly responsible for someone who has the potential for exposure. The objective is to provide training, continuing education and certification.

20-1.2 Purpose

The purpose of this standard is to provide minimum criteria, identified by industry consensus, to ensure compliance with the referenced standards and codes in Standard 12001 and the requirements of Standard 12020, and to minimize exposure of pathogens, biohazards and other potentially infectious material (OPIM) in the work place. ASSE Standard 12020 covers employers, or employers' representatives, of construction and maintenance personnel including, but not limited to, plumbers, pipefitters, sprinkler fitters, HVAC technicians, demolition laborers and mechanical systems workers.

20-1.3 Limitations

Compliance with this standard in itself shall not constitute compliance with the requirements for construction and maintenance personnel as defined by ASSE 12010, 12030, 12040, 12060, 12061, 12062, or 12063.

20-1.4 References, Industry Standards and Codes

The references, industry standards and codes listed in ASSE Standard 12001 are a part of this standard.

20-2.1 General Knowledge

- 20-2.1.1 The ASSE 12020 certified employer shall be able to identify and demonstrate knowledge of the applicable laws, rules and regulations from the federal, state and local levels pertaining to ASSE 12000.
- 20-2.1.2 The ASSE 12020 certified employer shall be able to identify the proper procedures to notify all Authorities Having Jurisdiction (AHJ).
- 20-2.1.3 The ASSE 12020 certified employer shall be able to demonstrate knowledge of the following concepts:
 - a) Appropriate method for recognizing tasks and activities that may involve exposure
 - b) Criteria for the selection, use, cleaning, maintenance, storage, disposal and limitations of personal protective equipment (PPE)
 - c) Emergency procedures involving pathogens of OPIM
 - d) Employer responsibilities
 - e) Epidemiology of pathogens, biohazards and infectious disease
 - f) Explanation of an exposure control plan
 - g) Exposure protocols
 - h) Hepatitis B virus (HBV) vaccine protocols
 - i) Hepatitis B
 - j) Hepatitis C
 - k) Modes of transmission of pathogens, biohazards and infectious diseases
 - l) Post exposure protocols
 - m) Signage and labeling regulations
 - n) Use and limitation of proper work practice protocols

20-2.2 Exposure Control Plan

The ASSE 12020 certified employer shall be able to identify and describe the proper exposure control plan and identify the following components:

- a. Communication of hazards to employees
- b. Exposure determination
- c. Post exposure follow-up
- d. Procedures for evaluating circumstances surrounding an exposure incident
- e. Recordkeeping
- f. Schedule and method for implementing sections of the standard covering methods of compliance

20-2.3 Engineering and Work Practice Controls

20-2.3.1 The ASSE 12020 certified employer shall be able to identify and describe the proper engineering and work practice controls pertaining to:

- a) Engineering designs or controls that may reduce the employees' exposure by either removing the hazard or isolating the individual from exposure
- b) Proper disposal of biological hazards
- c) Schedule for re-examination of practices
- d) Work practice controls that alter the manner in which a task is performed

20-2.4 Precautionary Measures

20-2.4.1 The ASSE 12020 certified employer shall be able to understand the Universal Precautions method: all stagnant water, drainage, waste and vent pipes, human and animal blood, and bodily fluids should be considered potentially infectious.

20-2.4.2 The ASSE 12020 certified employer shall be able to identify and describe the appropriate use and handling of PPE:

- a) The employer shall ensure that PPE is properly used, cleaned, laundered, repaired or replaced, as needed, or discarded
- b) Hypoallergenic gloves or other similar alternatives shall be made available

20-2.4.3 The ASSE 12020 certified employer shall be able to describe the precautions and hazards associated with the following:

- a) Sharps
- b) OPIM
- c) Damaged PPE

20-2.4.4 The ASSE 12020 certified employer shall provide the training to employees in accordance with ASSE 12010.

20-2.5 Documenting and Recording

20-2.5.1 The ASSE 12020 certified employer shall have knowledge of the following documentation requirements:

- a) Availability of records
- b) Confidentiality requirements
- c) Exposure control plan
- d) Hepatitis B vaccination records
- e) Medical exams and tests of employees related to an exposed worker
- f) Medical records related to an exposed worker
- g) Training records
- h) Transfer of records

20-3.1 Terminology

The ASSE 12020 certified employer shall maintain, for their records, a current copy of the ASSE Series 12000.

20-4.1 Certification

All candidates for certification shall meet all of the following criteria:

20-4.1.1 Successful completion of an OSHA 10 or OSHA 30 class prior to attending a 12020-training course.

20-4.1.2 Successful completion of a minimum 8-hour training course encompassing all aspects of ASSE Standard 12020.

20-4.1.3 Successfully pass a written exam with a minimum of 25 questions encompassing aspects of ASSE Standard 12020 with a score of at least 80%.

20-4.1.4 Certification to this standard shall be through a nationally recognized third-party certification agency.

20-4.1.5 Certification shall be for a three (3) year period.

20-4.2 Recertification

Recertification shall include:

20-4.2.1 Successful completion of a minimum two (2) hour of training encompassing all aspects of ASSE Series 12020

20-4.2.2 Successfully pass a written exam with a minimum of 25 questions encompassing aspects of ASSE Standard 12020 with a score of at least 80%.

20-4.2.3 Certification shall be through a nationally recognized third-party certification agency.

20-4.2.4 Certification shall be for a three (3) year period.

Waterborne Pathogens Professional Qualifications Standard for Construction and Maintenance Personnel

30-1.1 Scope

This standard provides general knowledge of waterborne pathogens, biohazards, viruses, microorganisms, bacteria, protozoa, mold, algae and other potentially infectious material (OPIM) for construction and maintenance personnel, or for any individual who has the potential for exposure. The objective is to provide training, continuing education and certification.

30-1.2 Purpose

The purpose of this standard is to provide minimum criteria, identified by industry consensus, to ensure compliance with the referenced standards and codes in Standard 12001 and the requirements of Standard 12030, and to minimize exposure of waterborne pathogens and bacteria in the work place. ASSE Standard 12030 covers construction and maintenance personnel including, but not limited to, plumbers, pipefitters, sprinkler fitters, HVAC technicians, demolition laborers and mechanical systems workers.

30-1.3 Limitations

Compliance with this standard in itself shall not constitute compliance with the requirements for the construction and maintenance personnel and employers as defined by ASSE 12010, 12020, 12040, 12060, 12061, 12062, or 12063.

30-1.4 References, Industry Standards and Codes

The references, industry standards and codes listed in ASSE Standard 12001 are a part of this standard.

30-2.1 General Knowledge

30-2.1.1 The ASSE 12030 certified individual shall be able to identify and demonstrate knowledge of the applicable laws, rules and regulations from the federal, state and local levels pertaining to ASSE 12000.

30-2.1.2 The ASSE 12030 certified individual shall be able to identify the proper procedures to notify all Authorities Having Jurisdiction (AHJ).

30-2.1.3 The ASSE 12030 certified individual shall be able to demonstrate knowledge of the following concepts:

- a) ASHRAE Guideline 12
- b) ASHRAE Standard 188
- c) Basic facts of Legionella bacteria
- d) Chemical, thermal and ultraviolet disinfection methods
- e) Employer responsibilities
- f) Exposure protocols
- g) How microorganisms, bacteria, amoebas and OPIM may be transmitted
- h) Post exposure protocols
- i) Sign and labeling regulations
- j) Sources of bacteria
- k) Understanding a water treatment management plan
- l) Water temperature effects on the growth of Legionella bacteria and OPIM

30-2.2 Exposure Control Plan

The ASSE 12030 certified individual shall be able to identify and describe the proper exposure control plan and identify the following components:

- a) Exposure determination
- b) Methods of compliance

30-2.3 Engineering and Work Practice Controls

30-2.3.1 The ASSE 12030 certified individual shall be able to identify and describe the proper engineering and work practice controls pertaining to:

- a) Engineering designs, chemical, temperature or ultra-violet controls that may reduce the employees' exposure by either removing the hazard or isolating the individual from exposure
- b) Proper disposal of biological hazards
- c) Schedule for re-examination of practices
- d) Work practice controls that alter the manner in which a task is performed

30-2.4 Precautionary Measures

30-2.4.1 The ASSE 12030 certified individual shall be able to understand the Universal Precautions method: all stagnant water, drainage, waste and vent pipes, human and animal blood, and bodily fluids should be considered potentially infectious.

30-2.4.2 The ASSE 12030 certified individual shall be able to identify and describe the appropriate use and handling of PPE:

- a) The individual shall ensure that PPE is properly used, cleaned, laundered, repaired or replaced, as needed, or discarded
- b) Hypoallergenic gloves or other similar alternatives shall be made available

30-2.4.3 The ASSE 12030 certified individual shall be able to describe the precautions and hazards associated with the following:

- a) Sharps
- b) *Legionella* bacteria
- c) Other potentially infectious material (OPIM) including, but not limited to:
 - a) Aspergillus
 - b) Cryptosporidium
 - c) *E. coli*
 - d) Fecal coliform and *Escherichia coli* (*E. coli*)
 - e) Fecal indicators (Enterococci or coliphage)
 - f) *Giardia lamblia*
 - g) Hepatitis B
 - h) Hepatitis B virus (HBV) vaccine protocols
 - i) Hepatitis C
 - j) Mold
 - k) *Naegleria Fowleri* (brain eating amoeba)
 - l) Total coliforms
 - m) Viruses

- d) Exposure protocols
- e) Damaged PPE
- f) Appropriate method for recognizing tasks and activities which may involve exposure
- g) Criteria for the selection, use, cleaning, maintenance, storage, disposal and limitations of personal protective equipment (PPE)
- h) Emergency procedures involving pathogens or other potentially infectious material (OPIM)
- i) Employer responsibilities
- j) Employee responsibilities
- k) Epidemiology of pathogens, biohazards, micro-organisms, bacteria and infectious diseases
- l) Explanation of an exposure control plan
- m) Modes of transmission of pathogens, biohazards and infectious diseases
- n) Post exposure protocols
- o) Sign and labeling regulations
- p) Use and limitation of proper work practice protocols

30-2.4.4 The ASSE 12030 certified individual shall be familiar with *Legionella* water management, treatment and control plans.

30-2.5 Documenting and Recording

30-2.5.1 The ASSE 12030 certified individual shall have knowledge of the following documentation requirements:

- a) Availability of records
- b) Confidentiality requirements
- c) Exposure control plan
- d) Medical exams and tests of employees related to an exposed worker
- e) Medical records related to an exposed worker
- f) Training records
- g) Transfer of records

30-3.1 Terminology

The ASSE 12030 certified individual shall be able to demonstrate a basic working knowledge of all terminology listed in Appendix C.

30-4.1 Certification

All candidates for certification shall meet all of the following criteria:

- 30-4.1.1 Successful completion of an OSHA 10 or OSHA 30 class prior to attending a 12030-training course.
- 30-4.1.2 Successful completion of a minimum 4-hour training course encompassing all aspects of ASSE Standard 12030.
- 30-4.1.3 Successfully pass a written exam with a minimum of 25 questions encompassing aspects of ASSE Standard 12030 with a score of at least 80%.
- 30-4.1.4 Certification to this standard shall be through a nationally recognized third-party certification agency.
- 20-4.1.5 Certification shall be for a three (3) year period.

30-4.2 Recertification

Recertification shall include:

- 30-4.2.1 Successful completion of a minimum one (1) hour of training encompassing all aspects of ASSE Series 12030
- 30-4.2.2 Successfully pass a written exam with a minimum of 25 questions encompassing aspects of ASSE Standard 12030 with a score of at least 80%.
- 30-4.2.3 Certification shall be through a nationally recognized third-party certification agency.
- 30-4.2.4 Certification shall be for a three (3) year period.

Professional Qualifications Standard for Construction and Maintenance Personnel for Contamination/Infection Prevention Procedures to Protect Facility Occupants and Operations

40-1.1 Scope

This standard provides general knowledge about contamination/infection prevention procedures to protect facility occupants and operations with the objective of providing training, continuing education and certification.

40-1.2 Purpose

The purpose of this standard is to provide minimum criteria, identified by industry consensus, to ensure compliance with the referenced standards and codes in Standard 12001 and the requirements of Standard 12040. Standard 12040 covers construction and maintenance personnel including, but not limited to, plumbers, pipefitters, sprinkler fitters, HVAC technicians, demolition laborers and mechanical systems workers concerning the procedures used to prevent contamination and infections in facilities and operations.

40-1.3 Limitations

Compliance with this standard in itself shall not constitute compliance with the requirements for the construction and maintenance personnel and employers as defined by ASSE 12010, 12020, 12030, 12060, 12061, 12062, or 12063.

40-1.4 References, Industry Standards and Codes

The references, industry standards and codes listed in ASSE Standard 12001 are a part of this standard.

40-2.1 General Knowledge

40-2.1.1 The ASSE 12040 certified individual shall be able to identify and demonstrate knowledge of the applicable laws, rules and regulations from the federal, state and local levels pertaining to ASSE 12000.

40-2.1.2 The ASSE 12040 certified individual shall be able to identify the proper procedures to notify all Authorities Having Jurisdiction (AHJ).

40-2.1.3 The ASSE 12040 certified individual shall be able to demonstrate knowledge of the following concepts:

- a) Employer responsibilities
- b) Facilities' construction and renovation plans (CRP)
- c) Healthcare associated (nosocomial) infections (HAI)
- d) Infection control commissioning
- e) Infection control risk assessment (ICRA) (see Appendix B)
- f) Life safety plan
- g) Preconstruction risk assessment (PCRA)

40-2.2 Engineering and Work Practice Controls

40-2.2.1 The ASSE 12040 certified individual shall be able to demonstrate a working knowledge of the following:

- a) Accommodations for personal protective equipment (PPE)
- b) Hand washing facilities
- c) HVAC systems – ventilation and environmental control
- d) Mechanical systems involving water supply, plumbing and drainage, including mold and fungus growth prevention and remediation
- e) Sewage spill cleanup operations
- f) Sharps disposal
- g) Vibration controls

40-2.3 Precautionary Measures

- 40-2.3.1 The ASSE 12040 certified individual shall be able to demonstrate a working knowledge of the following:
- a) Dust control barriers – semi-permanent or temporary
 - b) Housekeeping and debris removal
 - c) Interruption of utility services
 - d) Walk-off mats

40-2.4 Documenting and Recording

- 40-2.4.1 The ASSE 12040 certified individual shall have knowledge of the following documentation requirements:
- a) Facility and first responder's emergency phone numbers
 - b) Hot work permits
 - c) Open ceiling permits
 - d) Post construction reports and analysis
 - e) Project checklists
 - f) Risk assessment and training

40-3.1 Terminology

The ASSE 12040 certified individual shall be able to demonstrate a basic working knowledge of all terminology listed in Appendix C.

40-4.1 Certification

All candidates for certification shall meet all of the following criteria:

- 40-4.1.1 Successful completion of an OSHA 10 or OSHA 30 class prior to attending a 12040-training course.
- 40-4.1.2 Successful completion of a minimum 4-hour training course encompassing all aspects of ASSE Standard 12040.
- 40-4.1.3 Successfully pass a written exam with a minimum of 25 questions encompassing aspects of ASSE Standard 12040 with a score of at least 80%.
- 40-4.1.4 Certification to this standard shall be through a nationally recognized third-party certification agency.
- 40-4.1.5 Certification shall be for a three (3) year period.

40-4.2 Recertification

Recertification shall include:

- 40-4.2.1 Successful completion of a minimum one (1) hour of training encompassing all aspects of ASSE Series 12040
- 40-4.2.2 Successfully pass a written exam with a minimum of 25 questions encompassing aspects of ASSE Standard 12040 with a score of at least 80%.
- 40-4.2.3 Certification shall be through a nationally recognized third-party certification agency.
- 40-4.2.4 Certification shall be for a three (3) year period.

Water Quality Program Professional Qualifications Standard for Employers and Designated Representatives

60-1.1 Scope

This standard provides general knowledge of developing and implementing a water systems risk management program. The objective is to provide training, education and certification to employers or designated representatives.

60-1.2 Purpose

The purpose of this standard is to provide minimum criteria, identified by industry consensus, to ensure compliance with the referenced standards and codes in Standard 12001 and the requirements of Standard 12060, and the knowledge and skills to develop and implement a water system risk management program. ASSE Standard 12060 covers employers or designated representatives, of construction professionals including, but not limited to, plumbers, pipefitters, sprinkler fitters, and HVAC technicians.

60-1.3 Limitations

Compliance with this standard in itself shall not constitute compliance with the requirements for construction and maintenance personnel as defined by ASSE 12010, 12020, 12030, 12040 12061, 12062 and 12063.

60-1.4 References, Industry Standards and Codes

The references, industry standards and codes listed in ASSE Standard 12001 are a part of this standard.

60-2.1 General Knowledge

60-2.1.1 The ASSE 12060 certified employer, or designated representative, shall be able to identify and demonstrate knowledge of the applicable laws, rules and regulations from the federal, state and local levels pertaining to ASSE 12060.

60-2.1.2 The ASSE 12060 certified employer, or designated representative, shall be able to identify the proper procedures to notify all Authorities Having Jurisdiction (AHJ).

60-2.1.3 The ASSE 12060 certified employer, or designated representative, shall be able to demonstrate knowledge of the following:

- a) Appropriate method for surveying building water systems in order to identify risks, implement control measures, and provide appropriate documentation.
- b.) Criteria for the selection, use, cleaning, maintenance, storage, disposal and limitations of personal protective equipment (PPE)
- c) Documentation and record keeping
- d) Emergency procedures involving pathogens of other potentially infectious material (OPIM)
- e) Employer responsibilities
- f) Epidemiology of pathogens, biohazards and infectious disease
- g) Explanation of an exposure control plan
- h) Exposure protocols
- i) Post exposure protocols
- j) Potential hazardous conditions within water systems.
- k) Use and limitation of proper work practice protocols
- l) Directives of the Water Management Team

60-2.2 Water Systems

- 60-2.2.1 The ASSE 12060 certified employer, or designated representative, shall be able to describe the buildings water system and is responsible for identifying the following components:
- a) Commissioning requirements
 - b) Documentation and record keeping procedures
 - c) Water management team
 - d) Water quality assessments
 - e) Water system schematics
 - f) Water system surveys
 - g) Water systems within the building
 - h) Where hazardous conditions may occur

60-2.3 Water Quality Programs

- 60-2.3.1 The ASSE 12060 certified employer, or designated representative, shall be able to demonstrate knowledge of how to:
- a) Conduct water quality assessments
 - b) Determine control limits
 - c) Determine control plan
 - d) Determine locations for control measures
 - e) Verify the risk level of occupancy of the building
 - f) Establish documentation and record keeping procedures.
 - g) Evaluate where hazardous conditions may occur.
 - h) Prioritize workflow with a water management team
 - i) Survey appropriate water systems within the building and develop water system schematics.
 - j) Follow directives of the Water Management Team

60-2.4 Precautionary Measures

- 60-2.4.1 The ASSE 12060 certified employer, or designated representative, shall be able to describe the risks, precautions and hazards including but not limited to: potable water systems, cooling towers and evaporative condensers, whirlpool spas, ornamental fountains and other water features, and aerosol-generating misters, atomizers, air washers, humidifiers, fire sprinkler systems, heating and cooling systems and ice machines in regard to the systems that they are responsible for:
- a) Contingency response plan
 - b) System maintenance
 - c) System changes or remodeling
 - d) System start up and shut down
 - e) Water sampling
 - f) Water treatment

60-2.5 Documenting and Recording

- 60-2.5.1 The ASSE 12060 certified employer, or designated representative, shall have knowledge of the following documentation requirements:
- a) Assessment results
 - b) Chain of Custody form
 - c) Employment records
 - d) Training Records
 - e) Water sampling schedules and results

60-3.1 Terminology

The ASSE 12060 certified employer, or designated representative, shall be able to demonstrate a basic working knowledge of all terminology listed in Appendix C related to water quality and maintain, for their records, a current copy of the ASSE Series 12000.

60-4.1 Certification

All candidates for certification shall meet all the following criteria:

- 60-4.1.1 Successful completion of a minimum 4-hour training course encompassing all aspects of ASSE Standard 12060.
- 60-4.1.2 Successfully pass a written exam with a minimum of 25 questions encompassing aspects of ASSE Standard 12060 with a score of at least 80%.
- 60-4.1.3 Certification to this standard shall be through a nationally recognized third-party certification agency.
- 60-4.1.4 Certification shall be for a three (3) year period.

60-4.2 Recertification

Recertification shall include:

- 60-4.2.1 Successful completion of a minimum two (2) hour training course encompassing all aspects of ASSE Series 12060.
- 60-4.2.2 Successfully pass a written exam with a minimum of 25 questions encompassing all aspects of ASSE Standard 12060 with a score of at least 80%.
- 60-4.2.3 Certification to this standard shall be through a nationally recognized third-party certification agency
- 60-4.2.4 Certification shall be for a three (3) year period.

Water Quality Program Professional Qualifications Standard for Plumbers

61-1.1 Scope

This standard provides general knowledge of developing and implementing a water quality risk management plan for plumbing systems. The objective is to provide training, education and certification to plumbers working on these systems.

61-1.2 Purpose

The purpose of this standard is to provide minimum criteria, identified by industry consensus, to ensure compliance with the referenced standards and codes in Standard 12001 and the requirements of Standards 12060 and 12061, and the knowledge and skills necessary to develop and implement a water system risk management plan for plumbers and plumbing systems.

61-1.3 Limitations

Compliance with this standard in itself shall not constitute compliance with the requirements for construction and maintenance personnel as defined by ASSE 12010, 12020, 12030, 12040, 12062, and 12063.

61-1.4 References, Industry Standards and Codes

The references, industry standards and codes listed in ASSE Standard 12001 are a part of this standard.

61-2.1 General Knowledge

61-2.1.1 The ASSE 12061 certified plumber shall be able to identify and demonstrate knowledge of the applicable laws, rules and regulations from the federal, state and local levels pertaining to ASSE 12060 and 12061.

61-2.1.2 The ASSE 12061 certified plumber shall be able to identify the proper procedures to notify all Authorities Having Jurisdiction (AHJ).

61-2.1.3 The ASSE 12061 certified plumber shall be able to demonstrate knowledge of the following:

- a) Appropriate method for surveying potable water systems within a building
- b) Criteria for the selection, use, cleaning, maintenance, storage, disposal and limitations of personal protective equipment (PPE)
- c) Documentation and record keeping
- d) Emergency procedures involving pathogens of other potentially infectious material (OPIM)
- e) Employer responsibilities
- f) Epidemiology of pathogens, biohazards and infectious disease
- g) Explanation of an exposure control plan
- h) Exposure protocols
- i) Post exposure protocols
- j) Potential hazardous conditions within water systems.
- k) Use and limitation of proper work practice protocols
- l) Water sampling protocols

61-2.2 Potable Water Systems

- 61-2.2.1 The ASSE 12061 certified plumber shall be able to identify and describe:
- a) All potable water systems, components and connections to the system within the building including but not limited to:
 - 1. Aerators
 - 2. Aerosol-generating misters, atomizers, air washers and humidifiers
 - 3. Electronic faucets
 - 4. Expansion tanks
 - 5. Faucet flow restrictors
 - 6. Hot and cold-water storage tanks
 - 7. Ice machines
 - 8. Infrequently used equipment
 - 9. Non-steam aerosol-generating humidifiers
 - 10. Operating manuals
 - 11. Ornamental fountains and other water features
 - 12. Potable water distribution piping
 - 13. Shower heads and hoses
 - 14. Therapy pools
 - 15. Water filters
 - 16. Water heaters
 - 17. Water-hammer arrestors
 - 18. Whirlpool spas
 - b) Corrective actions
 - c) Documentation requirements
 - d) Water quality samples
 - e) Water system diagrams

61-2.3 Water Quality Program

- 61-2.3.1 The ASSE 12061 certified plumber shall be able to demonstrate knowledge of how to:
- a) Conduct water quality assessments
 - b) Determine control limits
 - c) Determine control plan
 - d) Determine locations for control measures
 - e) Document and record findings.
 - f) Evaluate where hazardous conditions may occur.
 - g) Identify the water management team
 - h) Survey water systems within the building
 - i) Develop water system schematics.

60-2.4 Precautionary Measures

- 61-2.4.1 The ASSE 12061 certified plumber shall be able to describe the risks, precautions and hazards including but not limited to: potable water systems, plumbing fixtures and equipment, whirlpool spas, ornamental fountains and other water features, and aerosol-generating misters, atomizers, air washers, and humidifiers in regard to:
- a) Contingency response plan
 - b) System maintenance
 - c) System changes or remodels
 - d) System start up and shut down
 - e) Water treatment

61-2.5 Documenting and Recording

- 61-2.5.1 The ASSE 12061 certified plumber shall have knowledge of the following documentation requirements:
- a) Assessment results
 - b) Chain of Custody form
 - c) Training Records
 - d) Water sampling schedules and results

61-3.1 Terminology

The ASSE 12061 certified plumber shall be able to demonstrate a basic working knowledge of all terminology listed in Appendix C related to potable water quality and maintain, for their records, a current copy of the ASSE Series 12000.

61-4.1 Certification

All candidates for certification shall meet all the following criteria:

- 61-4.1.1 The candidate shall have a minimum of five (5) years of documented practical experience in the installation and/or maintenance of plumbing systems.
- 61-4.1.2 Successful completion of a minimum 12-hour training course encompassing all aspects of ASSE Standard 12060 and 12061.
- 61-4.1.3 Successfully pass a written exam with a minimum of 50 questions encompassing all aspects of ASSE Standard 12060 and 12061 with a score of at least 80%.
- 61-4.1.4 Certification to this standard shall be through a nationally recognized third-party certification agency.
- 61-4.1.5 Certification shall be for a three (3) year period.

61-4.2 Recertification

Recertification shall include:

- 61-4.2.1 Successful completion of a minimum three (3) hour training course encompassing all aspects of ASSE Series 12060 and 12061.
- 61-4.2.2 Successfully pass a written exam with a minimum of 25 questions encompassing all aspects of ASSE Standard 12060 and 12061 with a score of at least 80%.
- 61-4.2.3 Certification to this standard shall be through a nationally recognized third-party certification agency
- 61-4.2.4 Certification shall be for a three (3) year period.

Water Quality Program Professional Qualifications Standard for Pipefitters and HVAC Technicians

62-1.1 Scope

This standard provides general knowledge of developing and implementing a water quality risk management plan for mechanical systems. The objective is to provide training, education and certification to pipefitters and HVAC technicians working on these systems.

62-1.2 Purpose

The purpose of this standard is to provide minimum criteria, identified by industry consensus, to ensure compliance with the referenced standards and codes in Standard 12001 and the requirements of Standards 12060 and 12062, and the knowledge and skills necessary to develop and implement a water system risk management plan for mechanical systems.

62-1.3 Limitations

Compliance with this standard in itself shall not constitute compliance with the requirements for construction and maintenance personnel as defined by ASSE 12010, 12020, 12030, 12040, 12061, and 12063.

62-1.4 References, Industry Standards and Codes

The references, industry standards and codes listed in ASSE Standard 12001 are a part of this standard.

62-2.1 General Knowledge

62-2.1.1 The ASSE 12062 certified pipefitter and HVAC technician pipefitter and HVAC technician shall be able to identify and demonstrate knowledge of the applicable laws, rules and regulations from the federal, state and local levels pertaining to ASSE 12060 and 12062.

62-2.1.2 The ASSE 12062 certified pipefitter and HVAC technician pipefitter and HVAC technician shall be able to identify the proper procedures to notify all Authorities Having Jurisdiction (AHJ).

62-2.1.3 The ASSE 12062 certified pipefitter and HVAC technician shall be able to demonstrate knowledge of the following:

- a) Appropriate methods for surveying applicable mechanical systems
- b) Criteria for the selection, use, cleaning, maintenance, storage, disposal and limitations of personal protective equipment (PPE)
- c) Documentation and record keeping
- d) Emergency procedures involving pathogens of other potentially infectious material (OPIM)
- e) Employer responsibilities
- f) Epidemiology of pathogens, biohazards and infectious disease
- g) Explanation of an exposure control plan
- h) Exposure protocols
- i) Post exposure protocols
- j) Potential hazardous conditions within water systems
- k) Use and limitation of proper work practice protocols
- l) Water sampling protocols

62-2.2 Water Systems

- 62-2.2.1 The ASSE 12062 certified pipefitter and HVAC technician shall be able to identify and describe the building's mechanical systems and identify the following water components:
- a) All heating, cooling and process water systems within the building
 - b) Cooling towers
 - c) Corrective actions
 - d) Documentation requirements
 - e) Evaporative condensers
 - f) Heating, cooling, and process water distribution piping
 - g) Ice machines
 - h) Operating manuals
 - i) Plate and frame HEXs used for "free cooling"
 - j) Water management team
 - k) Water quality samples
 - l) Water system diagrams

62-2.3 Water Quality Program

- 62-2.3.1 The ASSE 12062 certified pipefitter and HVAC technician shall be able to demonstrate knowledge of how to:
- a) Conduct water quality assessments
 - b) Determine control limits
 - c) Determine control plan
 - d) Determine locations for control measures
 - e) Document and record findings.
 - f) Evaluate where hazardous conditions may occur
 - g) Identify the water management team
 - h) Survey water systems
 - i) Develop water system schematics

62-2.4 Precautionary Measures

- 62-2.4.1 The ASSE 12062 certified pipefitter and HVAC technician shall be able to describe the risks, precautions and hazards associated with mechanical water systems in regard to:
- a) Contingency response plan
 - b) System maintenance
 - c) System changes and remodels
 - d) System start up and shut down
 - e) Water sampling
 - f) Water treatment

62-2.5 Documenting and Recording

- 62-2.5.1 The ASSE 12062 certified pipefitter and HVAC technician shall have knowledge of the following documentation requirements:
- a) Assessment results
 - b) Chain of Custody form
 - c) Training Records
 - d) Water sampling schedules and results

62-3.1 Terminology

The ASSE 12062 certified pipefitter and HVAC technician shall be able to demonstrate a basic working knowledge of all terminology listed in Appendix C related to water quality and maintain, for their records, a current copy of the ASSE Series 12000.

62-4.1 Certification

All candidates for certification shall meet all the following criteria:

- 62-4.1.1 The candidate shall have a minimum of five (5) years of documented practical experience in the installation and/or maintenance of mechanical systems.
- 62-4.1.2 Successful completion of a minimum 12-hour training course encompassing all aspects of ASSE Standard 12060 and 12062.
- 62-4.1.3 Successfully pass a written exam with a minimum of 50 questions encompassing all aspects of ASSE Standard 12060 and 12062 with a score of at least 80%.
- 62-4.1.4 Certification to this standard shall be through a nationally recognized third-party certification agency.
- 62-4.1.5 Certification shall be for a three (3) year period.

61-4.2 Recertification

Recertification shall include:

- 62-4.2.1 Successful completion of a minimum three (3) hour training course encompassing all aspects of ASSE Series 12060 and 12062.
- 62-4.2.2 Successfully pass a written exam with a minimum of 25 questions encompassing all aspects of ASSE Standard 12060 and 12062 with a score of at least 80%.
- 62-4.2.3 Certification to this standard shall be through a nationally recognized third-party certification agency
- 62-4.2.4 Certification shall be for a three (3) year period.

Water Quality Program Professional Qualifications Standard for Sprinkler Fitters

63-1.1 Scope

This standard provides general knowledge of developing and implementing a water quality risk management plan for water-based fire protection systems. The objective is to provide training, education and certification for sprinkler fitters working on these systems.

63-1.2 Purpose

The purpose of this standard is to provide minimum criteria, identified by industry consensus, to ensure compliance with the referenced standards and codes in Standard 12001 and the requirements of Standards 12060 and 12063, and the knowledge and skills necessary to develop and implement a water system risk management plan for water-based fire protection systems.

63-1.3 Limitations

Compliance with this standard in itself shall not constitute compliance with the requirements for construction and maintenance personnel as defined by ASSE 12010, 12020, 12030, 12040, 12061, and 12062.

63-1.4 References, Industry Standards and Codes

The references, industry standards and codes listed in ASSE Standard 12001 are a part of this standard.

63-2.1 General Knowledge

63-2.1.1 The ASSE 12063 certified sprinkler fitter shall be able to identify and demonstrate knowledge of the applicable laws, rules and regulations from the federal, state and local levels pertaining to ASSE 12060 and 12063.

63-2.1.2 The ASSE 12063 certified sprinkler fitter shall be able to identify the proper procedures to notify all Authorities Having Jurisdiction (AHJ).

63-2.1.3 The ASSE 12063 certified sprinkler fitter shall be able to demonstrate knowledge of the following:

- a) Appropriate method for surveying a building's fire protection systems.
- b) Criteria for the selection, use, cleaning, maintenance, storage, disposal and limitations of personal protective equipment (PPE)
- c) Documentation and record keeping
- d) Emergency procedures involving pathogens of other potentially infectious material (OPIM)
- e) Employer responsibilities
- f) Epidemiology of pathogens, biohazards and infectious disease
- g) Explanation of an exposure control plan
- h) Exposure protocols
- i) Post exposure protocols
- j) Potential hazardous conditions within water systems.
- k) Use and limitation of proper work practice protocols
- l) Water sampling protocols

63-2.2 Water Systems

63-2.2.1 The ASSE 12063 certified sprinkler fitter shall be able to identify and describe the buildings fire protection system and identify the following components:

- a) All water-based fire protection systems within the building
- b) Corrective actions
- c) Documentation requirements
- d) List all fire protection equipment that come in contact with water.
- e) Monitoring procedures
- f) Operating manuals
- g) Water quality samples
- h) Fire protection system diagrams.
- i) Water supply and storage for fire protection purposes

63-2.3 Water Quality Program

63-2.3.1 The ASSE 12063 certified sprinkler fitter shall be able to demonstrate knowledge of how to:

- a) Conduct water quality assessments
- b) Determine control limits
- c) Determine control plan
- d) Determine locations for control measures
- e) Document and record findings.
- f) Evaluate where hazardous conditions may occur.
- g) Identify the water management team
- h) Survey water-based fire protection systems
- i) Develop water-based fire protection system schematics.

63-2.4 Precautionary Measures

63-2.4.1 The ASSE 12063 certified sprinkler fitter shall be able to describe the risks, precautions and hazards to water quality associated with fire protection systems in regard to:

- a) Contingency response plan
- b) Discharge of the system
- c) System inspections, testing and maintenance
- d) System changes and remodel
- e) System start up and shut down
- f) Water sampling
- g) Water treatment

63-2.5 Documenting and Recording

63-2.5.1 The ASSE 12063 certified sprinkler fitter shall have knowledge of the following documentation requirements:

- a) Assessment results
- b) Chain of Custody form
- c) Training Records
- d) Water sampling schedules and results

63-3.1 Terminology

The ASSE 12063 certified sprinkler fitter shall be able to demonstrate a basic working knowledge of all terminology listed in Appendix C related to fire protection systems and maintain, for their records, a current copy of the ASSE Series 12000.

63-4.1 Certification

All candidates for certification shall meet all the following criteria:

63-4.1.1 Candidate shall have a minimum of five (5) years of documented practical experience in the installation and/or maintenance of water-based fire protection systems.

63-4.1.2 Successful completion of a minimum 12-hour training course encompassing all aspects of ASSE Standard 12060 and 12063.

63-4.1.3 Successfully pass a written exam with a minimum of 50 questions encompassing aspects of ASSE Standard 12060 and 12063 with a score of at least 80%.

63-4.1.4 Certification to this standard shall be through a nationally recognized third-party certification agency.

63-4.1.5 Certification shall be for a three (3) year period.

63-4.2 Recertification

Recertification shall include:

63-4.2.1 Successful completion of a minimum two (2) hour training course encompassing all aspects of ASSE Series 12060 and 12063.

63-4.2.2 Successfully pass a written exam with a minimum of 25 questions encompassing all aspects of ASSE Standard 12060 and 12063 with a score of at least 80%.

63-4.2.3 Certification to this standard shall be through a nationally recognized third-party certification agency

63-4.2.4 Certification shall be for a three (3) year period.

Personal Protective Equipment

When engineering, work practice and administrative controls are not feasible or do not provide sufficient protection, employers must provide personal protective equipment to their employees and ensure its proper use. The employer must also provide for adequate cleaning, maintenance, storage and disposal of this equipment.

The personal protective equipment listed below, commonly referred to as “PPE,” is equipment worn to minimize exposure to a variety of hazards, which are within the purview of this standard.

To provide for maximum protection, employers and employees must:

1. Understand the types of PPE
2. Know the basics of conducting a “hazard assessment” of the workplace
3. Select appropriate PPE for the assessed hazard
4. Select appropriate PPE within the spirit of “Universal Precautions”
5. Understand the kinds of training needed for the proper use and care of PPE

Personal protective equipment that provides adequate protection from hazards within the purview of this standard includes, but is not limited to:

1. **Gloves:** made of latex, or some other impermeable material, that will not allow fluids to flow through.
2. **Face Shield:** full face – for splash protection.
3. **Full Body Protective Suit:** preferably made of highly breathable flash spun high-density fibers that provide strength, tear resistance and liquid impermeability – for splash protection.

CAUTION: These suits do not provide the level of protection of a full hazmat suit.

4. **Boots:** water proof.
5. **Respiratory Filter Mask:** properly fit-tested annually, at a minimum, and NIOSH approved to N-95 level, at a minimum – to protect personnel from inhaling airborne diseases.

Upon removal of PPE, personnel must use proper body cleansing techniques, particularly hand and face washing.

Infection Prevention / Control Risk Assessment

This matrix is typically completed by the preconstruction risk assessment team at a healthcare facility to identify the degree of hazard to the patients, occupants and operations by the type of construction activity and the risk group to determine the class of precautions. This assessment is now mandated by the Joint Commission and the Centers for Medicare and Medicaid Services (CMS).

The first thing to be determined is the type of construction activity.

TYPE OF CONSTRUCTION ACTIVITY

TYPE A	Inspection and non-invasive activity Includes, but not limited to: <ul style="list-style-type: none"> • Installing wall coverings, minor electrical trim work, minor plumbing repairs • Removal of ceiling tiles for visual inspection – limited to one tile per 50 sq. feet • Painting (but no sanding) • Any activities that do not generate dust
TYPE B	Small scale, short duration activities that create minimal dust Includes, but not limited to: <ul style="list-style-type: none"> • Telephone, computer and IT cabling • Access to mechanical / electrical chases through access doors / openings • Cuttings of walls or ceilings where dust migration can be controlled
TYPE C	Any work that generates a moderate to high level of dust or requires demolition / removal of any fixed building component Includes, but not limited to: <ul style="list-style-type: none"> • Sanding of walls for painting or wall covering applications • Removal of floor coverings, ceiling tiles or casework • All new construction • Minor ductwork or electrical work above ceilings • Major telephone, computer or IT cabling installations • Piping installation of every kind • Any activity that cannot be completed in a single work shift
TYPE D	Major demolition and construction projects Includes, but not limited to: <ul style="list-style-type: none"> • Consecutive work shifts • Heavy demolition, such as removal of a complete ceiling system • New construction

The next to be determined is the risk group affected by the construction activity. If more than one risk group is affected during the construction, select the higher risk group.

RISK GROUPS

LOW RISK	MEDIUM RISK	HIGH RISK	HIGHEST RISK
<ul style="list-style-type: none"> • Engineering spaces • Non-patient corridors • Office areas 	<ul style="list-style-type: none"> • Admission areas • Cardiology • Cafeteria seating • Echocardiography • General physical and occupational therapy • General stores • Linen storage • Medical outpatient • Nuclear medicine • Radiology / MRI • Respiratory therapy 	<ul style="list-style-type: none"> • Adult Intensive Care • CCU • Endoscopy • Emergency room • Kitchen / food prep • Labor and Delivery • Laboratories (specimens) • Laundry • Medical units • Newborn nursery • Pediatrics • Pharmacy • Post anesthesia care • Surgical units 	<ul style="list-style-type: none"> • Any area caring for immunocompromised patients • Burn unit • Cardiac cath lab • Central sterile supply • Dialysis • Intensive care units, i.e. NICU, PICU • IVF laboratory • Negative pressure isolation rooms • Oncology • Operating rooms including C-section rooms • Organ and bone marrow transplant rooms • Outpatient surgery

* Some facilities may categorize their departments differently than above.

** Note: any work involving a sanitary drain, waste or vent pipe, stagnant domestic or process water line that has not been flushed in over seven days, or demolition of tanks or equipment where aerosols or exposure to the contents can occur in any building type or location should be considered a high risk for exposure to organic pathogens, micro-organisms, bacteria, amoebas and other potentially infectious material. Appropriate personal protective equipment and precautions should be used when working in potentially hazardous locations to protect workers and building occupants.

The next step is to use the construction project type with the patient risk group on the following matrix to find the class of precautions or degree of infection control activities required. The class is depicted by a Roman numeral – I, II, III or IV.

INFECTION CONTROL MATRIX

	TYPE A	TYPE B	TYPE C	TYPE D
LOW RISK GROUP	I	II	II	III / IV
MEDIUM RISK GROUP	I	II	III	IV
HIGH RISK GROUP	I	II	III / IV	IV
HIGHEST RISK GROUP	II	III / IV	III / IV	IV

INFECTION CONTROL PRECAUTIONS BY CLASS

PROJECT	DURING THE CONSTRUCTION PROJECT	UPON COMPLETION OF
CLASS I	<ul style="list-style-type: none"> • Execute work using methods to minimize dust • Immediately replace ceiling tiles displaced for visual inspection • Temporary barriers may be required 	<ul style="list-style-type: none"> • Clean work area upon completion of task
CLASS II	<ul style="list-style-type: none"> • Provide active means to prevent air-borne dust from dispersing into the atmosphere • Isolate the area • Water mist work surfaces to control dust while cutting • Seal unused door with tape • Block and seal air vents, especially return air grills • Wipe surfaces with disinfectant • Contain construction debris in containers with integral covers before transport • Place walk-off mats at entrance and exit of work area • Remove or isolate HVAC air distribution system in work area 	<ul style="list-style-type: none"> • Wipe surfaces with disinfectant • Wet mop and/or vacuum with HEPA filtered vacuum before leaving work area • Remove all blocking from air distribution grills • Restore HVAC air distribution system
CLASS III	<ul style="list-style-type: none"> • Isolate HVAC air distribution system in the work area • Complete all critical barriers or implement HEPA tent procedures before any construction activity • Maintain negative air pressure or HEPA filter air in work area • Seal holes, pipes, conduits and punctures • Place walk-off mats at entrance and exit of work area • Vacuum area with HEPA filtered vacuum • Personnel required to wear shoe covers within work area • Contain construction debris in containers with integral covers before transport 	<ul style="list-style-type: none"> • Do not remove construction barriers from work area until project is complete and the area is thoroughly cleaned. Depending on the type of barriers, a temporary enclosure may be required to remove the barriers. • Vacuum area with HEPA filtered vacuum • Wet mop area with cleaner/disinfectant • Restore HVAC system in area

PROJECT	DURING THE CONSTRUCTION PROJECT	UPON COMPLETION OF
CLASS IV	<ul style="list-style-type: none"> Isolate HVAC air distribution system in the work area Complete all critical barriers or implement HEPA tent procedures before any construction activity Maintain negative air pressure or HEPA filter air in the work area Seal holes, pipes, conduits and punctures Place walk-off mats at entrance and exit of work area Construct anteroom and require all personnel to pass through this room so they can be vacuumed using a HEPA filtered vacuum cleaner before leaving the work area, or they must wear cloth or paper coveralls that are removed each time they leave the work area All personnel entering the work area must wear shoe covers. Shoe covers must be changed each time the worker exits the work area. Contain construction debris in containers with integral lids before transport 	<ul style="list-style-type: none"> Do not remove construction barriers from work area until project is complete and the area is thoroughly cleaned. Depending on the type of barriers, a temporary enclosure may be required to remove the barriers. Vacuum area with HEPA filtered vacuum Wet mop area with cleaner/disinfectant Restore HVAC system in area

The individual should demonstrate knowledge of procedures for controlling the growth of pathogens in water-based piping systems. A Legionella water management plan should be in place to minimize the growth legionella bacteria and other organic pathogens. The water management plan should comply with ASHRAE 188 and ASHRAE Guideline 12.

Vocabulary and Definitions

– A –

Absolute Pressure

Fluid pressure measured above a perfect vacuum. It is the pressure indicated by an ordinary pressure gauge, plus the atmospheric pressure.

Administrative Authority

An individual official, board, department or agency established and authorized by a state, county, city or other political subdivision created by law to administer and enforce the provisions of the plumbing code as adopted or amended. Shall include the administrative authority's duly authorized representative.

All Building Systems

All structural, electrical, mechanical and ornamental components, including plumbing, HVAC and fire protection systems.

Approved

Acceptable to the authority having jurisdiction

Assistant Secretary

Assistant Secretary of Labor for Occupational Safety and Health, or designated representative.

At-Risk Individual

Any person who, because of age, health, medication, occupation or habits, such as smoking, is more susceptible than the general population to developing legionellosis.

Assessment

An inspection and analysis of a system.

Authority Having Jurisdiction (AHJ)

An organization, office or individual responsible for enforcing the requirements of a code or standard, or for approving equipment, materials, installations or procedures.

– B –

Blood

Human blood, human blood components and products made from human blood.

Bloodborne Pathogens

Pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

Building Water System

Includes hot and cold water distribution and all devices that use water people can be exposed to, such as hot tubs, decorative fountains, and cooling towers.

– C –

Centralized Building Water System

Any water-receiving system that distributes its water to multiple uses (potable, utility or other) and/or multiple locations within the building or site. Each of these uses can further extend to other sub-processes; for example, potable water is often used for hot water distribution.

Clinical Laboratory

A workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious materials.

Construction

Includes new construction, remodeling, repairs and maintenance within a facility and all supporting utilities and facilities and their systems.

Consumer

Person or facility receiving service from a potable water system.

Contaminated

Presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.

Contaminated Laundry

Laundry which has been soiled with blood or other potentially infectious materials.

Contaminated Sharps

Any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes and exposed ends of dental wires.

Control

To manage the conditions within all building systems water systems according to the water management program.

Control Limit

A maximum value, a minimum value or a range to which a chemical or physical parameter associated with a Control Measure must be monitored in order to reduce the occurrence of a hazardous condition to an acceptable level.

Control Measure

A disinfectant, heating, cooling, filtering, flushing, or other means, methods, or procedures used to maintain the physical or chemical conditions of water to within Control Limits.

Control Points

Locations in the water system where a control measure can be applied.

Corrective Action

Action to be taken to return control values to within established limits, when monitoring or measurement indicates the control values are outside the established Control Limits.

Criterion

A standard on which a judgment or decision can be based.

-D-

Decontamination

Use of physical or chemical means to remove, inactivate or destroy pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles, so the surface or item is rendered safe for handling, use or disposal.

Degree of Hazard

Derived from the evaluation of conditions within a water system which can be classified as either a "health hazard" or "non-health hazard."

Deviation

Failure to meet a critical limit.

Director

Director of the National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services or designated representative.

Disinfectant

Chemical or physical treatment used to kill bacteria.

-E-

Engineering Controls

Controls that isolate or remove the pathogens hazard from the workplace.

Exposure Incident

A specific eye, mouth, other mucous membrane, non-intact skin or parenteral contact with blood or other potentially infectious materials that result from the performance of an employee's duties.

-F-

No definitions.

-G-

No definitions.

-H-

Hand Washing Facilities

A facility providing an adequate supply of running potable water, soap and single use towels or hot air-drying machines.

Hazard

A biological, chemical or physical agent that can cause illness or injury in the absence of its control (reference: National Advisory Committee on Microbiological Criteria for Foods definition).

Hazard (*Legionella*)

Legionella bacteria in a building water system that can cause harm or injury in the absence of its control.

Hazardous Condition (*Legionella*)

A condition that contributes to the potential for harmful human exposure to *Legionella*.

HBV

Hepatitis B virus.

HEPA Filter

A high efficiency particulate air filter that must remove 99.97% of all particles greater than 0.3 microns from the air that passes through it.

HIV

Human immunodeficiency virus.

-I-

Immunocompromised

A condition describing an individual who has increased susceptibility to infections. This condition may be due to existing human disease, to medication regimens or to other types of medical treatment.

Infection

The process of infecting or the state of being infected by a pathogen.

-J-

No definitions.

-K-

No definitions.

-L-

Labeled

Equipment or materials to which has been attached a label, symbol or other identifying mark of an organization that is acceptable to the authority having jurisdiction and concerned with product evaluation, maintains periodic inspection of the production of labeled equipment or materials, and by whose labeling the manufacturer indicates compliance with appropriate standards or performance in a specified manner.

Legionella

Genus of bacteria that was subsequently discovered as the disease causative pathogen associated with the 1976 outbreak of disease at the American Legion convention in Philadelphia. Legionellae are common aquatic bacteria found in natural and man-made water systems, as well as occasionally in some soils. More than 50 species of *Legionella* have been identified. However, one species in particular, *Legionella pneumophila*, is associated with the vast majority (approximately 90%) of legionellosis cases.

Legionellae

Plural of *Legionella*. This term is used to refer to more than one type of *Legionella* bacterium and is often used to refer to all species of *Legionella*.

Legionellosis

Term used to describe any illness caused by exposure to *Legionella* bacteria. Legionnaires' disease (LD) and Pontiac fever are the two most common types of legionellosis, with Legionnaires' disease being the more serious and primary concern for human health.

Legionnaires' Disease (LD)

An acute bacterial infection of the lower respiratory tract with accompanying pneumonia.

Liability

Legally responsible for, or being obligated by law, for the protection of the potable water supply.

Listed

Equipment, materials or services included in a list published by an organization that is acceptable to the authority having jurisdiction and concerned with evaluation of products or services, maintains periodic inspection of the production of listed equipment or materials or periodic evaluation of services, and whose listing states that either the equipment, material or service meets appropriate designated standards or has been tested and found suitable for a specified purpose.

-M-

Monitoring

A planned sequence of observations or measurements with temperature or chemical monitoring devices to assess water quality to produce an accurate record for future use in verification.

Monitoring Procedures

A set of procedures describing a continuous process of monitoring all critical control points identified in a hazard analysis plan.

-N-

Negligence

Not meeting one's responsibilities and causing harm.

Non-Potable Water or System

Water not safe for drinking, personal or culinary use.

Nontoxic

Not poisonous; a substance that will not cause illness or discomfort if consumed.

Nosocomial Infection

Infection acquired by patients or other occupants in a healthcare facility.

-O-

Occupational Exposure

Reasonably anticipated skin, eye, mucous membrane or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

OPIM

See Other Potentially Infectious Materials.

Other Potentially Infectious Materials (OPIM)

(1) The following human body fluids: semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, all body fluids that are visibly contaminated with blood and all body fluids in situations where it is difficult or impossible to differentiate between body fluids; (2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and (3) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

Parenteral

Piercing mucous membranes or the skin barrier through such events as needle sticks, human bites, cuts and abrasions.

Pathogen

A disease-causing agent or organism.

Personal Protective Equipment (PPE)

Specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

Plumbing

Includes the work and/or practice, materials and fixtures used in the installation, removal, maintenance, extension and alterations of a plumbing system of all piping, fixtures, fixed appliances and appurtenances in connection with any of the following: sanitary drainage, storm drainage facilities, special wastes, the venting system and the public or private water supply systems within or adjacent to any building, structure or conveyance to their connection with any point of public disposal or other acceptable terminal within the property line. The pipe fixtures and all other apparatuses concerned in the introduction, distribution and disposal of water in a building. The pipes, fixtures and other apparatuses of a water, gas or sewage system.

Potable Water

Water which is suitable for drinking, culinary and personal purposes. Water free from impurities in amounts sufficient to cause disease or harmful physiological effects. Water from any source which has been approved for human consumption by the health agency having jurisdiction.

Potable Water System

A building water distribution system intended for human consumption.

Process Flow Diagram

A schematic diagram of the steps used in the processing of water in a building from the point that it is received to the point that it is dispensed or disposed of. Other typical steps include conditioning, storing, heating and distributing the water.

Process Monitoring Instrument

A device used to indicate process conditions at a critical control point.

Process Water System

A building water or building utility water distribution system that provides water intended for uses other than human consumption.

No definitions.

Regulating Agency

Any local, state or federal authority given the power to issue rules or regulations having the force of law for the purpose of providing uniformity in details and procedures.

Regulated Waste

Liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; pathological and microbiological wastes containing blood or other potentially infectious materials.

Research Laboratory

A laboratory producing or using research-laboratory-scale amounts of HIV or HBV. Research laboratories may produce high concentrations of HIV or HBV, but not in the volume found in production facilities.

Residual

The amount of disinfectant available in water to kill germs.

Risk

An estimate of the probability that an identified hazard will be harmful (the risk of legionellosis cannot be quantitatively measured).

Risk Group (*Legionella*)

Any person who, because of age, health, medication, occupation or habits such as smoking, is more susceptible than the general population to developing Legionellosis.

Safe Drinking Water Act

Act of 1974, through the Environmental Protection Agency (EPA), the Federal Government established national standards of safe drinking water.

Sanitize

To make sanitary (as by cleaning or sterilizing) 2. to make more acceptable by removing unpleasant or undesired features.

Separation (Physical Disconnection)

Removal of pipes, fittings or fixtures that connect a potable water supply to a non-potable system or one of questionable quality.

Serogroup

A sub-set of bacteria within an identified species. *Legionella pneumophila* has 17 numbered serogroups, of which serogroup one causes most legionellosis.

Shall

The term, when used in a plumbing code, has a mandatory meaning. Compare “may,” which is permissive rather than mandatory. A mandatory requirement.

Sharps

Articles that may cause punctures or cuts to those handling them, including all broken glassware, syringes, needles, scalpel blades, suture needles and disposable razors.

Should

A term which indicates a feature, or requirement, which is desirable but not mandatory. Indicates a recommended procedure, technique or requirement.

Source Individual

Any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee. Examples include, but are not limited to, hospital and clinic patients, clients in institutions for the developmentally disabled, trauma victims, clients of drug and alcohol treatment facilities, residents of hospices and nursing homes, human remains, and individuals who donate or sell blood or blood components.

Sprinkler Fitter

A person who installs, modifies, repairs, maintains, test, and inspects fire protection systems. Sprinkler systems installed by sprinkler fitters include the underground supply as well as the integrated overhead piping systems and standpipes.

Stagnation

Water which has very little, if any, flow. It enhances the growth of biofilm, reduces water temperature, and reduces the amount of disinfectant.

Standard

A document, the main text of which contains only mandatory provisions using the word “shall” to indicate requirements and which is in a form generally suitable for mandatory reference by another standard or code, or for adoption into law. Non-mandatory provisions shall be located in an appendix or annex, footnote or fine-print note and are not to be considered a part of the requirements of a standard.

Sterilize

Use of a physical or chemical procedure to destroy all microbial life, including highly resistant bacterial endospores.

-T-

Toxic

A substance which is poisonous and capable of causing injury or death. A toxin may be ingested, inhaled or absorbed through the skin. A substance which has not been approved for human consumption by the health agency having jurisdiction.

-U-

Universal Precautions

An approach to infection control. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV and other pathogens.

-V-

No definitions.

-W-

Water

Liquid that descends from the clouds as rain, forms streams, lakes and seas, issues from the ground in springs, and is a major constituent of all living matter and, when pure, consists of an oxide of hydrogen (H₂O), in the proportion of two atoms of hydrogen to one atom of oxygen. It is an odorless, tasteless, very slightly compressible liquid which appears bluish in thick layers. Freezes at 32 °F (0 °C) and boils at 212 °F (100 °C). Has a maximum density at 39.2 °F (4 °C), a high specific heat, contains very small equal concentrations of hydrogen ions and hydroxide ions, reacts neutrally and constitutes a poor conductor of electricity; a good ionizing agent.

Water-Based Fire Protection System

A system consisting of an integrated network of piping, sprinklers and appurtenances designed in accordance with fire protection engineering standards that includes a water supply source, a water control valve, a waterflow alarm, and a drain.

Waterborne Disease

Any disease that is primarily transmitted through water (for example: *Legionella*, Typhoid, Cholera, Giardiasis).

Waterborne Pathogens

Any organisms capable of causing disease that may be transmitted via water and acquired through ingestion, bathing, breathing in aerosolized droplets or by other means.

Work Practice Controls

Controls that reduce the likelihood of exposure by altering the manner in which a task is performed (for example: prohibiting recapping of needles by a two-handed technique).

No definitions. ~~-X-~~

No definitions. ~~-Y-~~

No definitions. ~~-Z-~~

Reference Documents

- American Industrial Hygiene Association (AIHA). (2005). *Field Guide for the Determination of Biological Contaminants in Environmental Samples*. 2nd Edition.
- American Society of Plumbing Engineers (ASPE). (2009). *Legionnaires' Disease. Plumbing Engineering Design Guide*. Volume 2.
- Barbaree, J.M., Dufour, A.P., Freije, J.M. (1996). *Legionellae Control in Health Care Facilities: A Guide for Minimizing Risk*.
- Burge, H. A. (1995). *Bioaerosols*. CRC Press.
- Centers for Disease Control and Prevention (CDC). (2004). *Guidelines for Preventing Health Care Associated Pneumonia*. MMWR. Vol. 53, No. RR-3.
- Centers for Disease Control and Prevention (CDC). (2011). *Top 10 Things Every Clinician Needs to Know About Legionellosis*. Retrieved from: <http://www.cdc.gov/legionella/top10.htm>.
- Centers for Disease Control and Prevention (CDC). *Facts About Legionella and Hot Tubs*. CDC 24/7: Saving Lives. Protecting People.
- Centers for Disease Control and Prevention (CDC). *Legionella – Recreational Water Illness (RWI)*. *Healthy Swimming & Recreation*
- Florida Department of Health. (2009). *Guidelines for the Surveillance, Investigation, and Control of Legionnaires' Disease in Florida*. Retrieved from: http://www.floridahealth.gov/healthy-environments/indoor-air-quality/_documents/Legionella.pdf.
- Maryland Department of Health & Mental Hygiene. (2002). *Legionnaires' Disease Fact Sheet*. *Epidemiology & Disease Control Program*.
- Rosa, F. (1993). *Legionnaires' Disease, Prevention & Control*.

WICRA forms

ASSE SERIES 12000 • APPENDIX E

Building Water System Control Measures

BUILDING WATER SYSTEM HAZARD ANALYSIS	TYPE A	TYPE B	TYPE C	TYPE D
GROUP 1	I	I	I/II	I/II
GROUP 2	II	II	III	IV
GROUP 3	II	III	III	IV
GROUP 4	II	III	IV	IV

Control Measures

CLASS I	<ol style="list-style-type: none"> 1. Minimize stagnation of water by flushing outlets weekly in fixtures less frequently used 2. Monitor cold water temperature of faucets ensure $\leq 65^{\circ}\text{F}$ 3. Monitor hot water temperature of faucets ensure $\geq 110^{\circ}\text{F}$ 4. Ensure Drinking Fountains internal chiller keeps water $< 60^{\circ}\text{F}$, water stream is effective flow 5. Ensure back flow preventers are installed to prevent contamination due to backflow 6. Ensure all debris and sediment filters are maintained per manufacturer's recommendation 7. Inspect and clean internals of domestic hot water tanks annually for scale and sludge
CLASS II	<p>* <i>To Include Class I procedures and the following as applicable:</i></p> <ol style="list-style-type: none"> 1. Ensure quarterly sanitization and maintenance of Ice Machines 2. Perform descaling of Ice Machines every six months 3. Replace Ice Machine in-line filters every 30 days 4. Reduce aerosol potential from water jets of hydrotherapy pools, ensure system cleanliness and rules of basic hygiene 5. Ensure proper water treatment and observe water temperature of Ornamental Fountains 6. Ensure cold water storage tanks are properly insulated and bottoms blown down routinely
CLASS III	<p>* <i>To Include Class I and Class II procedures the following as applicable:</i></p> <ol style="list-style-type: none"> 1. Remove faucet aerators completely 2. Check outflow and return temperature of domestic water heaters $> 140^{\circ}\text{F}$ 3. Ensure the hot water distribution is being disinfected if there are no mixing valves installed to operate domestic hot water temperature at appropriate temperatures or there is not secondary disinfection of domestic water system 4. Ensure potable water secondary disinfection treatment is being properly maintained and the water tested at appropriate time intervals to ensure disinfectant is being properly fed
CLASS IV	<p>* <i>Includes Class I, II and III procedures:</i></p> <ol style="list-style-type: none"> 1. Monitor and maintain drift eliminates on Cooling Towers 2. Ensure chemical control, control of corrosion, scaling and microbiological fouling of cooling towers is in place

ASSE SERIES 12000 • APPENDIX E

Building Water System Types

TYPE *	CONTROL LOCATIONS
TYPE A	Receiving - Point of Entry (Water Main), Non-Centralized Hot Water Tanks or Heat Exchangers, Hot Water Distribution, Cold Water Distribution, Sanitary Waste
TYPE B	Receiving - Point of Entry (Water Main), Fire Suppression, Non-Centralized Hot Water Tanks or Heat Exchangers, Hot Water Distribution, Cold Water Distribution (hydrotherapy, decorative fountains, ice machines, hot tubes, pools, ponds), Sanitary Waste
TYPE C	Receiving - Point of Entry (Water Main), Fire Suppression, Centralized Heating, (instantaneous hot water heaters, water heaters, hot water storage), Hot Water Distribution, Cold Water Distribution (hydrotherapy, decorative fountains, ice machines, hot tubes, pools, ponds), Sanitary Waste
TYPE D	Receiving - Point of Entry (Water Main), Fire Suppression, Centralized Heating, (instantaneous hot water heaters water heaters, hot water storage), Hot Water Distribution, Cold Water Distribution (cooling tower, hydrotherapy, decorative fountains, ice machines, Hot Tubes, Pools, Ponds), Sanitary Waste

** Typing of building water system is interpreted from CDC Guidelines and ASHRAE Standard 188 – 2015*

Infection Control Risk Groups

GROUP 1: LOW RISK	GROUP 2: MEDIUM RISK	GROUP 3: HIGH RISK	GROUP 4: HIGHEST RISK
<ul style="list-style-type: none"> • Office Areas • Common Areas such as corridors and other public areas (not patient care areas) 	<ul style="list-style-type: none"> • Outpatient care areas not otherwise mentioned • Outpatient Surgery • Post- Anesthesia Care Units (PACU's) • Behavioral Health • Food and Nutrition • Cardiac Cath Lab • Radiation Therapy • Pharmacy • Laboratories (specimen) • Cardiology • Echocardiography • Endoscopy • Nuclear Medicine • Physical Therapy • Radiology/MRI • Respiratory Therapy • Assisted Living Facilities 	<ul style="list-style-type: none"> • Medical Inpatient units • Surgical Inpatient units • Medical Intensive Care Units • Surgical Intensive Care Units • Neuro Intensive Care Units • CCU • Labor and Delivery • Newborn nurseries • Pediatrics • Skilled Nursing Facilities • Long Term Acute Care Ventilator Units 	<ul style="list-style-type: none"> • Special units caring for immunocompromised patients (Protective Environments) • Burn Units • Oncology Units • Transplant Units

ASSE SERIES 12000 • APPENDIX E

Control Points of a Building Water System

POINT OF ENTRY RECEIVING	COLD WATER DISTRIBUTION	HEATING	HOT WATER DISTRIBUTION	WASTE
<ul style="list-style-type: none">• Municipal Water• Sprinkler System	<ul style="list-style-type: none">• Cooling Towers• Decorative Fountains• Ice Machines• Sinks Showers Hot Tub Pool Pond• Drinking Fountains	<ul style="list-style-type: none">• Water Heaters• Hot Water Storage• Heat Exchangers	<ul style="list-style-type: none">• Sinks• Showers• Kitchen Appliances	<ul style="list-style-type: none">• Sanitary Sewer

FACTORS EXTERNAL THAT CAN LEAD TO LEGIONELLA GROWTH

- **Construction:** Vibration and Changes in water pressure can dislodge biofilm and free Legionella into the water entering the building.
- **Water main breaks:** Changes in water pressure can dislodge biofilm and free legionella into the water, while dirt and other materials can be introduced into the water and use up disinfectant.
- **Changes in municipal water quality:** Changes in water quality can increase sediment, lower disinfectant levels, increase turbidity, or cause pH to be outside recommended ranges. Changes in disinfectant type can impact how you should monitor your program.

BUILDING WATER SYSTEM RISK ASSESSMENT: LEGIONELLA			
Building Name and Location:		Survey Date:	
Senior Organizational Leader:		Review Date:	
Facility Director:		Survey Expiration Date:	
Facilities Plumbing Forman:			
Check One	Building Water System Type	Check One	Infection Control Risk Group
	TYPE A: Receiving, Hot and Cold Water Distribution, Non-Centralized Hot Water Tanks or Heat Exchangers, Sanitary Waste		GROUP 1: Least Risk
	TYPE B: Receiving, Hot and Cold Water Distribution, Non-Centralized Hot Water Tanks or Heat Exchangers, (hydrotherapy, decorative fountains, ice machines, hot tubes, pools) Fire, Sanitary		GROUP 2: Medium Risk
	TYPE C: Receiving, Hot and Cold Water Distribution, Centralized Heating (instantaneous, Heaters, Storage), (hydrotherapy, decorative fountains, ice machines, hot tubes, pools), Fire, Sanitary		GROUP 3: High Risk
	TYPE D: Receiving, Hot and Cold Water Distribution, Cooling Towers, Centralized Heating (hydrotherapy, decorative fountains, ice machines, hot tubes, pools), Fire, Sanitary		GROUP 4: Highest Risk
Check One	Control Procedures		
CLASS I	1. Minimize stagnation of water by flushing outlets weekly in fixtures less frequently used 2. Monitor cold water temperature of faucets ensure < 65°F 3. Monitor hot water temperature of faucets ensure > 110°F 4. Ensure Drinking Fountains internal chiller keeps water < 60°F, water stream is effective flow 5. Ensure back flow preventers are installed to prevent contamination due to backflow 6. Ensure all debris and sediment filters are maintained per manufacturer's recommendation 7. Inspect and clean internals of domestic hot water tanks annually for scale and sludge		
CLASS II	* To include Class I procedures and the following as applicable: 1. Ensure quarterly sanitization and maintenance of Ice Machines 2. Perform descaling of Ice Machines every six months 3. Replace Ice Machine in-line filters every 30 days 4. Reduce aerosol potential from water jets of hydrotherapy pools, ensure system cleanliness and rules of basic hygiene 5. Ensure proper water treatment and observe water temperature of Ornamental Fountains 6. Ensure cold water storage tanks are properly insulated and bottoms blown down routinely		
CLASS III	* To include Class I & II procedures and the following: 1. Remove faucet aerators completely 2. Check outflow and return temperature of domestic water heaters > 140°F 3. Ensure the hot water distribution is being disinfected if there are no mixing valves installed to operate domestic hot water temperature at appropriate temperature or there is not secondary disinfection of the domestic water . 4. Ensure potable water secondary disinfection treatment is being properly maintained and the water tested at appropriate time intervals to ensure disinfectant is being properly feed.		
CLASS IV	* To include Class I, II & III procedures: 1. Monitor and maintain drift eliminators on Cooling Towers 2. Ensure chemical control, control of corrosion, scaling and microbiological fouling of cooling towers is in place.		

SIGNATURES:

I.C. _____ Date _____ Safety _____ Date _____

Facilities _____ Date _____ Administration _____ Date _____



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